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ABSTRACT

Wildlife is often described as one of Alaska's most important and valuable resources. Helping wildlife can take many forms. In this educational packet, a variety of activities are included to help primary students understand which human activities help wildlife and which harm wildlife. The activities included in this packet represent adaptations and combinations of activities from past years and from Project Wild under the unit theme "Together, We Can Help Wildlife." The three lessons included in this guide contain background information for teachers, introductory activities and ideas for curriculum integration. Examples of Alaskan food webs and food chains, game pieces, and "Etiquette for Wildlife Watchers" are included in an appendix. (CW)

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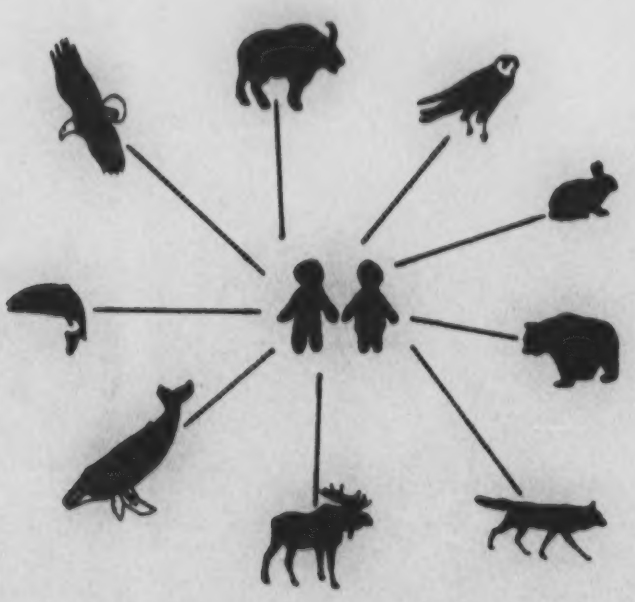
Alaska Wildlife Week

Primary Teacher's Guide



Unit 7. Together, We Can Help Wildlife. **April 23-29, 1989**

Alaska Department of Fish and Game -- Division of Wildlife Conservation
Nongame Wildlife Program

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Alaska Wildlife Week 1989

INTRODUCTION

Wildlife is often described as one of Alaska's most important and valuable resources. But few people think of wildlife in such general and somewhat remote terms. "Alaska wildlife," instead, is, first and foremost, the wild animals you and your students encounter on a daily basis as you wake up to warblings and chirpings in spring, or you ski or dog mush across a variety of tracks through the snow during winter. If, like many Alaskans, you hunt, trap, or fish; then you have necessarily learned something about the ways of the animals you pursue as well as the types of areas where you are most likely to find them. Or you may be inspired to bring home a particularly beautiful shell or a take a photograph, or to create artwork from your memory of a particularly beautiful wild animal or scene. Most Alaskans have personal experiences with the wildlife species that live in Alaska. The areas where we live and recreate are shared with wildlife. Many depend upon fish and wildlife to some degree for food or clothing or the source of materials for artwork and handicrafts. The 1989 theme, "**Together, We Can Help Wildlife**" celebrates the fact that many Alaskans are aware of and participating in activities that benefit wildlife directly or indirectly.

Helping wildlife can take many forms. In this educational packet, a variety of activities are included to help students understand which human activities help wildlife and which can harm wildlife. In addition, some Project Wild activities that will allow you and your class to become involved in "hands-on" projects are included.

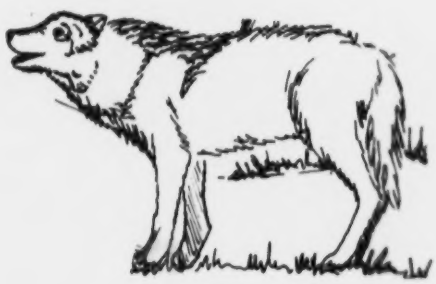
This year for the first time since Alaska Wildlife Week was initiated in 1983, we have not created a new packet of materials. Rather, we have **combined and adapted activities from past years** and from the Project Wild curriculum into a unit with the theme, "Together, We Can Help Wildlife." We hope that many of you have integrated past Alaska Wildlife Week materials into your curriculum so you can use this year's ideas as a means to **extend** and **reinforce** basic concepts about Alaskan ecosystems and management of Alaska's fish and wildlife. We have included several ideas for doing so for each activity and referenced the sections of the previous Teacher's Guides that provide background information for the teacher and introductory or additional activities. We encourage you to review these sections if you decide you or your students need additional preparation to make the best use of activities included in this year's unit. We are working to make more copies of past units available; in the meantime, check your school libraries for copies.

The Alaska Wildlife Week series now includes units related to ecology and ecosystems in general (Unit 4 - We All Need Each Other) and to three major Alaska ecosystems of Wetlands (Unit 2 - Water, Wetlands, and Wildlife), Forests (Unit 5 - Alaska's Forests ... more than just trees), and Tundra (Unit 6 - Alaska's Living Tundra); and units related to major wildlife management concepts of habitat (Unit 1 - Be It Ever So Humble ... there's no place like habitat) and wildlife population dynamics (Unit 3 - Wildlife for the Future). As we have noted in the Teacher's Guides, many of the activities developed about one Alaska ecosystem can be adapted for use for the ecosystem with which your students are most familiar, although we encourage you to continue to teach the students in Barrow about Alaska's coastal forests and the students in Ketchikan about tundra. The general concepts are applicable in every ecosystem and form the basis for the understanding of **how** human actions truly help or harm

The Teacher's Guides are organized so that the lessons build upon those previous. The student skills and the subjects are noted to allow for curriculum integration. All the activities were designed to help students develop or improve skills and knowledge in science, social studies, language arts, math, and/or art. Easy-to-duplicate worksheets may be used to review, reinforce, or evaluate student understanding of the lessons in this unit.

Please feel free to adapt and modify activities and worksheets to best suit your teaching style, students' learning styles, and your location and situation. Three separate Teacher's Guides were prepared -- one for Primary (K-3), Upper Elementary (4-6) and Junior/Senior High School. Check to be sure you have the one that best matches your students' knowledge and thinking skills.

We hope you will use these materials during Alaska Wildlife Week in 1989, as well as throughout this and other years. Please send any comments or suggestions about this project to: Alaska Wildlife Week, Alaska Department of Fish and Game, Division of Wildlife Conservation, P.O. Box 20, Douglas, AK 99824.



Unit 7. TOGETHER, WE CAN HELP WILDLIFE

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Alaska wetland ecosystem, with inset of microscopic organisms

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LESSON 1

Students will learn that human actions can affect wildlife and ways that human activities can help or harm wildlife.

BACKGROUND. Helping wildlife can take many forms. Human actions can benefit wildlife if they benefit individual animals, individual species, an ecosystem in which wildlife is a part, or if they help maintain global conditions upon which wildlife depend. While many activities are specifically undertaken to actively help wildlife, other actions that maintain conditions suitable for wildlife or avoid harming wildlife are equally important.

Helping Individual Wild Animals

You and your students are probably aware of things that people do or have done to help individual wild animals. The well-publicized rescue of three gray whales trapped in the ice at Barrow in fall, 1988, is a dramatic example of the large amount of human concern about the perceived suffering and imminent death of individual wild animals that could be prevented by human effort. People often try to care for sick or injured wild animals, many of which are hurt as a result of human actions such as wounding gunshots or litter that entangles or poisons. Millions of people in the U.S. feed birds year-round. When you first ask your students to think of things that help wildlife, they will likely list actions that help individual animals.

Often, humans help individual wild animals by the things they don't do, rather than by the things they do. When people encounter wild animals, they can easily disturb them with noise, chasing, or by just approaching more closely than the animal can tolerate. Tolerance for human activity differs for the raven that lives close to humans and learns quickly to feed on human garbage to the wolf which requires large expanses of wild lands. Nearly all wildlife species have periods in their life cycle when they are more sensitive to disturbance, usually during breeding or raising their young.

Helping Wildlife Populations

Many people are engaged in wildlife research, either as a volunteer or as a career. While they often work with many individual animals, they are generally concerned with **populations** of animals in relation to the desires or needs of people who use fish or wildlife. When people desire or need to harvest animals through hunting, trapping, and fishing; then the efforts of researchers and managers are directed at monitoring or ensuring that sufficient

numbers of animals are available over time to meet the demands. Similarly, when humans want to view or enjoy wildlife in ways that don't require harvesting (e.g., viewing, photography), then efforts are directed at maintaining this use, by monitoring and regulating human activity so that sensitive species are not displaced or disturbed. When human demands exceed what populations can sustain, then decisions are required to allocate wildlife populations to satisfy some, but not all, of those demands. In some cases, people can do things that result in increases in wildlife populations, such as rearing fish in hatcheries.

Your students may be less familiar with the concepts involved in managing wildife populations.

Unit 3 of Alaska Wildlife Week (Wildlife for the Future) focuses on these concepts. Several activities from Unit 3 are included in the Upper Elementary and Junior/Senior High versions of this packet. For additional teacher background, please refer to the Teacher's Guide for Unit 3.

The Importance of Habitat

The paramount factor in the potential or maximum size of wildlife populations is the amount of suitable **habitat** that exists. One way to think of a fish or wildlife population is in terms of a pie. A portion of the pie must remain after all the factors which cause deaths, including human actions, occur; in order to replenish the population through reproduction and births. But if the population is the pie, the habitat is the pie tin which ultimately limits the maximum size the population

habitat's **carrying capacity.** Maintaining habitat quantity and quality is the key to healthy and abundant fish and wildlife populations.

Habitat is the scientific term for an animal's home. An animal's habitat includes **food, water, shelter**, or cover, and **space**. Because animals need food, water, shelter, and space to be available in a way that is suitable for their needs, we say that these things must be available in a **suitable arrangement**.

For ideas on how to present the concept of habitat to your students, refer to Unit 1 of Alaska Wildlife Week or Project Wild activities such as **The Beautiful Basics, Everybody Needs a Home, Habitracks,** and **What's That, Habitat?**

Unfortunately, many things people do harm wildlife by reducing or degrading habitat. Some of these activities may be necessary to meet other human needs for housing, food, or places for commercial or industrial development. People can help wildlife by considering the effects of all human actions on fish and wildife and minimizing damage or loss of habitat as much as possible. In some cases, the benefits of maintaining

habitat outweighs the benefits of the activities that will degrade it. People play an important role in participating in political land-use decisions which weigh competing demands for publically-owned lands.

People also do things to improve habitat, such as building fish ladders so fish can migate up steep sections of rivers to suitable upstream habitat or building nest boxes for birds to increase the amount of nesting habitat. Other habitat improvement projects occur after habitat has been degraded by previous human actions. As examples, streams are restored after being damaged by logging or construction of roads or pipelines. Nest boxes are built for birds after natural nesting habitat has been reduced. However, it's important to understand that current efforts to improve or restore degraded habitat in no way equals or compensates for the large-scale habitat alteration and loss that occurs from many human activities.

Fish and Wildlife as Ecosystem Partners

A single species' habitat involves other living things. For example, plants can be food items, shelter from wind, or a safe hiding place from predators. Many species are interrelated and interdependent in **ecosystems**.

Very simply, the critical relationships of ecosystems involve the question of "who eats whom?" Food chains or webs are formed by these relationships. (A listing of "Alaska Food Chain and Food Web Examples" is included in Appendix 1 of this unit for reference in carrying out the activities using animals that your students are familiar with.)

Large-scale human development activities and even small-scale human activities can affect the entire ecosystem of which wildlife is a part. One objective of this unit is to help your students understand that many things people do affect wildlife indirectly by affecting seemingly unconnected ecosystem components. The ecosystem is also a pie tin, which contains the collective habitat or home of interconnected living things and their non-living support system (the sun, soil, air, and water).

Unit 4 of Alaska Wildlife Week (Web of Life) contains teacher background information and many activities to teach food chain and food web concepts. Four Alaska Wildlife Week units include teacher background and activities about ecosystems in general (Unit 4) and specific Alaska ecosystems: Wetlands (Unit 2), Forests (Unit 5) and Tundra (Unit 6). The Aquatic Project Wild Guide includes a "Guide to the Ecosystem Concept." With the use of these previous materials, activities in this unit about helping wildlife can be used as extensions to a unit on one of the Alaska ecosystems.

ETHI-THINKING

OBJECTIVE:

Students will generate a list of activities that can help or harm wildlife.

Subjects: Social Studies, Science, Language Arts
Skills: Analysis, description, discussion
Group Size: any
Setting: Indoors or outdoors
Key Vocabulary: harm, wildlife

Background:

This introductory activity can be used, with little preparation, to have students begin thinking about how human activities affect wildlife, or it can be used as a review after your class has completed lessons from other Alaska Wildlife Week units. If you are studying a specific Alaska ecosystem (forest, tundra, wetland, ocean), then discussion and this unit can be geared to the human actions that occur in that ecosystem. The introductory activity in Lesson 3 (page 25) reviews and extends this lesson.

PROCEDURE:

1. HAVE STUDENTS THINK OF THINGS THAT PEOPLE DO THAT AFFECT WILD PLANTS OR ANIMALS. Encourage students to "brainstorm" activities that people do that might affect wild plants or animals and decide whether it helps or harms them.

Examples of helpful things might be:
- Feeding birds during winter
- Caring for sick or injured animals
- Leaving bird nests alone

Some examples of harmful activities might be:
- Driving vehicles on wetlands or tundra
- Littering
- Picking up baby animals
- Chasing or scaring animals

2. WRITE THE ACTIVITIES DOWN AND KEEP THEM FOR USE IN LATER ACTIVITIES.

3. EXTENSION: HAVE STUDENTS THINK OF THINGS PEOPLE DO THAT AFFECT A PARTICULAR ECOSYSTEM (FOREST, TUNDRA, WETLAND, OCEAN).

ADAPTED FROM: PROJECT WILD "ETHI-THINKING, " and ALASKA WILDLIFE WEEK, UNIT 5.

Habitat Tag ..... Science / Social Studies

OBJECTIVE: Students will learn that human activities can help or harm wildlife populations by directly reducing habitat components of food and cover.

SKILLS: Awareness that people affect their surroundings, application, comparing similarities and differences, description, discussion, evaluation, generalization, observation, synthesis

BACKGROUND: This activity focuses on how human activities can affect wildlife **habitat**, specifically the habitat components of **food** and **cover**. You can use the activities listed in the Procedures, or any of the activities in the Human Action Cards included in the appendix or activities that you want to develop into an action-oriented project as described in Can Do!, the Project Wild activity which is also included in this packet. Or, you can use a specific food chain, e.g., the food cards could be labelled "willow" if the herbivore is a moose and the carnivores can be wolves. To prepare for this activity, you may need to have a lesson that introduces or reviews the concept of wildlife habitat for your students. This activity illustrates the concept of **food chains** and uses an **ecosystem** as the setting. Examples of Alaska Food Chains and Webs are listed in the appendix.

MATERIALS: Large, open play area, a timer, 1 set of index cards - 5 cards/student/class, each labelled "Food," or a food item name,masking tape, large pieces of paper labelled "Cover" - one for each student in the class plus 2 or 3 extra), 2 rolls of crepe paper, 20 sheets of 11x17 or larger paper or cardboard (paper grocery sacks would work). The larger paper sheets, or cardboard, should each be labelled with one of the following words or phrases: VILLAGE, AIRPORT, GARBAGE DUMP, GOLD MINE, OIL DRILLING PAD, PUMP STATION, GRAVEL EXCAVATION SITE, FUEL STORAGE TANK (you can substitute other human activities).

PROCEDURE:

1. PREPARE THE ECOSYSTEM: Scatter the "Food" cards on the floor around the large, open play area. Place the "Cover" cards on the floor so that they are distant from each other. Tape the Cover cards to the floor (on all 4 sides).

2. EXPLAIN THE RULES OF THE GAME: Explain to students that the class is going to play a game in which they will represent animals (specify an herbivore from the Alaska Food Chains in the appendix or a kind of small bird), and the play area represents the ecosystem in which the animals lives (Forest, Tundra, Wetland, or Ocean). Students, representing the animals, must find enough food and cover to survive and raise young during each short summer (i.e., round of the game). In order to survive the round, each player must collect 5 food cards, and be standing on a cover card before the timer rings the end of the round. If desired, you may also add carnivore players that must catch 2 prey to survive a round. (Carnivores that do not catch enough prey become prey players the next round).

3. PLAY A FEW ROUNDS: Have students play a few rounds of the game. Depending on your students and how well they play, you may wish to vary the length of the time for each round. Set the timer for 2 minutes at first, then lengthen or shorten the time as needed to allow most of the players to survive the winter. Record how many survive the summer. Collect all the food cards and scatter them again after each round.

4. INTRODUCE HUMAN ACTIVITIES: Explain that humans do many things that affect wildlife habitat and ecosystems. For example, they build villages (you can use other examples from the Human Action Cards or ones related to a project you plan to have the students undertake later). Ask students how building a village might affect the number of animals in the ecosystem. Take the piece of cardboard labelled "VILLAGE" and place it on the floor so that it covers up one of the "Cover" cards or some of the "Food" cards. Explain that the cards covered up are no longer available to the animals. (If necessary to prevent cheating, pick up the food cards). Play another round of the game to see if the number of animals surviving changes -- (it shouldn't).

Ask students if they can think of other things people do that change wildlife habitat and the ecosystem -- help them think of the activities listed on the Human Action Cards. As each activity is named, place a sheet with that activity shown on it on the floor over some of the food or cover cards. After adding a few more Human Action Cards, play another round. The number of surviving animals will now be less.

Continue adding additional Human Action Cards. Use the rolls of crepe paper to show roads or pipelines. Any card they touch becomes unusable. Play additional rounds of the game.

Do students understand why fewer animals can survive after the ecosystem has been greatly changes by humans? Why are the effects more serious when there are many changes in the ecosystem? How would the changes in the ecosystem affect people living there? Could they find as many plants to gather or animals to harvest?

Ecosystems and People ..... Science / Social Studies / Art

OBJECTIVE: Students will learn that human actions can help or harm wildlife indirectly by affecting living and non-living components of the ecosystem upon which they depend.

BACKGROUND: This activity builds on the concept of an ecosystem with many interacting parts, both non-living and living. Teacher background information and activities that teach your students to distinguish between non-living and living things are included in Unit 4 of Alaska Wildlife Week materials along with background and activities to introduce ecosystem concepts and many Alaska-specific examples. Additional activities and examples are included in Unit 5 for Alaska's forest ecosystems and Unit 6 for Alaska's tundra ecosystems.

MATERIALS: Butcher paper (if you want to save the drawing for use in the Favorite Animal activity in lesson 2).

PROCEDURE:

1. HAVE THE CLASS MAKE A LIST OF ALL THE THINGS PEOPLE DO AROUND YOUR AREA OR IN A SPECIFIC ECOSYSTEM (FOREST, WETLAND, TUNDRA, OCEAN:
Discuss how each of these activities might directly affect the non-living environment (air, water, and soil) or living things (plants, animals, fungi, microscopic organisms)
Write the effects on the board next to the activity and whether it is helpful or harmful and why.

2. CHOOSE AN ANIMAL THAT LIVES IN YOUR AREA OR IN THE ECOSYSTEM YOU ARE STUDYING:
Have students list the living and non-living things needed by this animal. (Does the animal drink water? Breathe air? Does the animal need oxygen made by the plants? Which living things does it eat? What other living things may it use in some way? List the different things it needs on the board and draw lines to connect these to the animal. Then, have students figure out what each of the listed living things needs. (Do the plants need soil? sunlight? water? pollinaters? seed carriers? decomposers to recycle minerals? What do each of the living things eat--do they depend on other living things?) List these and draw lines to show connections.

3. REVIEW THE LIST OF THINGS PEOPLE DO THAT AFFECT LIVING AND NON-LIVING THINGS:
How many of the activities affect something that is connected to the animal of concern by lines? These activities could affect populations of that animal. Students should recognize that everything humans do can affect living things. Discuss and compare the effects of one person doing a certain activity, and 100, 1000, or 4 billion doing that activity.

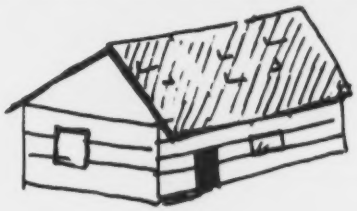
ART EXTENSION

HAVE YOUR STUDENTS COLOR THE WORKSHEET "ECOSYSTEMS AND PEOPLE."

ECOSYSTEMS AND PEOPLE

Name_____

Color in the human activities that affect ecosystems.



Building a house.

Fishing for salmon.

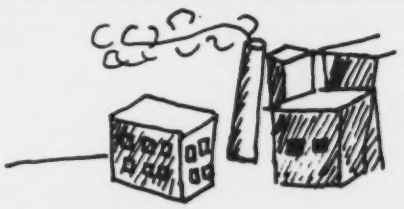
Driving cars, trucks, or snowmobiles.

Cutting down trees to get wood.

Building cities

Farming

Drilling for oil



Factories making toys.

Alaska Wildlife Week Unit 4. ©1986 ADF&G

Alaska boreal forest ecosystem, with inset of microscopic organisms

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LESSON 2

Students will learn to evaluate changes in ecosystems that result from human actions.

BACKGROUND: Lesson 1 was designed to **introduce or review** concepts of wildlife habitat, food chains, and ecosystems and to have your students begin thinking about how humans can affect wildlife. The second lesson provides activities for the students to begin observing changes in food chains and ecosystems that result from human activities and **evaluating** the changes in terms of what they might mean for wildlife and for humans.

The many inter-relationships between living things, and between living things and the non-living environment make ecosystems both resilient and fragile. Any change in the non-living surroundings, or in a population of any living thing, is likely to cause many other changes within an ecosystem. Changes in the non-living surroundings can affect all living things, because all use air, water, and minerals, and are affected by temperature, humidity, and light. A change in a population of one living thing will affect the populations of all the other living things it interacts with--through food chains and webs, or other kinds of interactions. The resulting changes in these populations, may in turn, affect the populations of all of the different living things these interact with. This chain reaction of changes means that a single change--in the non-living surroundings or in the population of a single kind of living thing--can indirectly affect many, or all, the living things in that ecosystem.

Ecosystems can and do tolerate and absorb changes in the non-living environment (such as weather and climatic changes, earthquakes, floods, etc.). Ecosystems can also tolerate and absorb changes in the numbers and kinds of living things present; extinction of certain species and invasion by others are natural and, over geologic time, constant occurrences. All ecosystems are in a state of constant change.

However, too many or severe changes in either the non-living surroundings, or the populations of living things can cause the many complex relationships in an ecosystem to be disrupted permanently. While such change may make the area uninhabitable for its present residents, species suitably adapted to the changed environment may colonize and become established. A new ecosystem may thus appear, often after a long period of time, with a whole different community of living things interconnected by different food webs and symbioses.

Nearly every human activity affects ecosystems. Each change may have desirable or undesirable consequences. The important thing to recognize is that every activity has potential consequences and to learn how to evaluate those consequences. Even an activity that seems only to affect insects, or fungi, the upper atmosphere, or ground water supplies can have far-reaching consequences.

OBJECTIVES:

Students will: 1) review the parts of an ecosystem and their interconnections by making a 3-dimensional model of the ecosystem around them and 2) recognize that people can do things to help or harm ecosystems.

Sujects: Science, Social Studies,
Skills: Observation, evaluation, generalization
Group Size: Small groups, pairs
Setting: Indoors
Key Vocabulary: ecosystem, effects

MATERIALS:

A wide variety of art materials, such as construction, butcher, and crepe paper, scissors, glue, staples, paint, masking tape, and clay, Human Action Cards for Forest, Wetland, or Tundra (in appendix to this guide).

PROCEDURE:

1. REVIEW THE CONCEPT OF AN ECOSYSTEM:

Review the concept of an ecosystem and the variety of living and non-living things that occur in every ecosystem.

2. CONVERT THE CLASSROOM INTO AN ECOSYSTEM:

Ask students to convert the classroom, or a portion of the room into an Alaska ecosystem (forest, tundra, wetland, or ocean). Review the various kinds of art techniques students have used during the year and encourage them to be creative in thinking of ways to portray living and non-living things. You may want to assign one group each to construct models of animals, plants, fungi, protists (seaweeds, algae, and protozoans), and non-living things. Or assign more specific groups (birds, mammals, mushrooms, lichens, trees, flowering plants, etc.) to individual students. Challenge students to portray representatives of all the living and non-living things in the ecosystem. They can observe or use references to find out the variety of things that occur, or you can pass out Wildlife and Ecosystem Partner Cards from previous Week units (See Wetland Wildlife Cards, Unit 2; Ecosystem Partner Cards, pp. 34-37, Unit 4; Primary Forest Wildlife Cards, pp. 18-27, Unit 5; and Tundra Cards, Supplement to Unit 6). Encourage students to create models that portray the colors, textures, and size of the things they portray.

3. STUDENTS EVALUATE THE MODEL:

To evaluate the model, choose individual animals and help the class determine whether the ecosystem includes all the things they need to survive. If not, have students add the missing items. If desirable, you can have students show all the ecosystem interconnections using lengths of string.

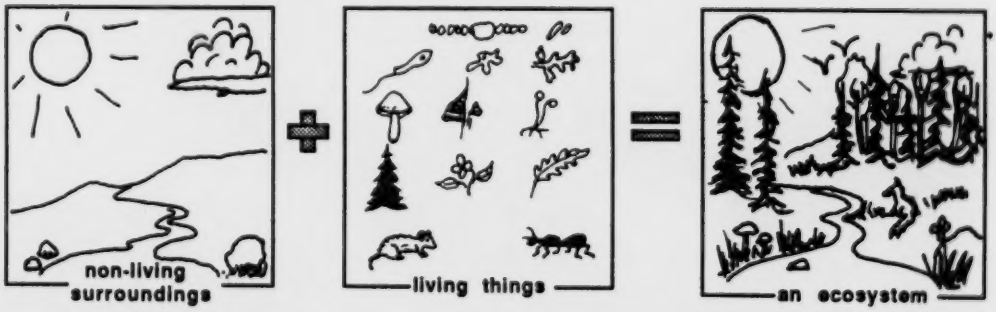
4. STUDENTS CHANGE THEIR ECOSYSTEM: Give each pair of students a Human Action Card for their ecosystem. Each of these describes a particular thing that people do that affects that particular ecosystem. Ask students to come up and pretend to do the activity described on the card. (For example, if their card says: "Some people leave cans, paper, and other trash in wetlands," the student could go get a piece of trash and toss it into the model. If the card says, "Some people cut down trees so they can use the wood to heat their homes," the student should remove some of the trees from the forest model.) Allow students to continue pretending to do these activities until their model is messed up (littered, most of the trees removed, etc.). Then, ask students to quit pretending and stop and look at what they have done to their ecosystem.

5. STUDENTS DISCUSS THE EFFECTS OF THEIR ACTIONS: Have students discuss how their model has changed. Are these changes good or bad? How do these changes affect the wildlife habitat? How do they affect the ecosystem? Does it still have clean air and water? Does it still provide homes for forest wildlife? Is it a beautiful place to hike? Explain that many ecosystems around the world have been and are being drastically changed by people.

4. STUDENTS EVALUATE HUMAN ACTIONS: Ask each student to re-read his/her card and decide whether the action helps or harms wildlife or other living things in the ecosystem. Write two columns on the board: 1) Things that help wildlife or the ecosystem, 2) Things that harm wildlife or the ecosystem. Have each student come up to the blackboard and read the card they are holding. Then ask them to stand under the column they think that activity belongs in. If the class agrees, then write the action under that column.

When all students have come up and classified their action, discuss what should be done about the activities that harm wildlife or the ecosystem. Should they be against the law? Allowed to continue? What if people were not allowed to do this activity anymore? Would anything else be affected? (As examples, raise question such as whether humans could survive without wood to heat homes, without plastics made from oil, without paper to write on, metals to make machines, etc.) Students should recognize that some of the activities may be necessary for people to continue living the way we do. Ask students how we might be able to prevent losses of wildlife habitat and ecosystems and still use other resources like wood or minerals.

EXTENSION: At a a field trip site or a nature trail near your school (See the supplement ot Alaska Wildlife Week Unit 5 to learn how to set up a Forest Learning Trail), set up a station at some site where humans have altered the ecosystem. See the "Human Activities- - Instructions" and the "Classroom Follow-up" on page 19 of the Forest Learning Trail supplement for an activity that integrates science and social studies skills.



People and Ecosystems - In the Field ..... **Science / Math / Art**

OBJECTIVES: Students will look for evidence of human activities and recognize that human activities affect ecosystems by comparing areas with and without human disturbance.

SKILLS: drawing, observation, comparison,

MATERIALS:
Pencils, crayons, 11 x 17 in paper (smaller size is OK), clipboards or cardboard for a writing surface, access to two outdoor sites -- one undisturbed site and one affected by human activities (a playground, parking lot or lawn is adequate, but you may want to choose a site that is affected by an activity such as logging, mining, litter, or agricuture; in a tundra or other type of wetland area, this could be a vehicle trail). Be careful not to compare a wet and dry site, or two sites with different aspects or slopes as these will vary due to factors other than human activities.

PROCEDURE:
1. STUDENTS PREPARE THEIR PAPERS. Have each student fold their paper in half, into 8 x 11 inch size. Ask them to label one half, "A Wild Ecosystem," and the other side, "The Ecosystem after People Changed It."

2. STUDENTS VISIT AN UNDISTURBED SITE AND DRAW A PICTURE. Ask students to look carefully at the undisturbed site and draw a picture of it.
a. Guide students through the drawing process by having them first look for all the non-living things in the area, and place these in their picture first. Encourage them to try to match the exact color of the air, water, and soil in their picture.

b. Then ask students to count the number of different kinds of producers (plants and algae) . Have them count the number of different kinds of producers they can find (record this number). Then have them look for animals or their sign (make sure they examine the ground for animal droppings and insects, and plant leaves and stems for signs of browse and for insects). Count up the number of diffent kinds of animals (birds, mammals, insects, and other invertebrates) found and ask them to add pictures of the most common kinds to their drawing. As a last step, repeat the procedure for fungi.

3. STUDENTS VISIT A DISTURBED SITE AND DRAW A PICTURE OF THIS SITE. Have students turn their papers over to the side that says "Disturbed Site." Follow steps a and b above with students, until they complete their second picture.

4. STUDENTS COMPARE THE NUMBERS AND PICTURES FROM THE TWO SITES. When students have completed the two drawings, return indoors, and have them open up their folded papers to show their two pictures side by side. Discuss the differences, if any, in the color of the air, water, and soil at the two sites. What caused the change? Use the numbers that you recorded to have older students make bar graphs of the numbers of kinds of plants, animals, and fungi at each site. Have students compare what the bar graphs show to what they show in their drawings. Ask students which site was more interesting, or had the most variety of living things. Can they explain why?

FAVORITE ANIMAL.....SCIENCE / SOCIAL STUDIES

OBJECTIVE:
Students will learn that in order to protect any kind of wildlife, we must protect their non-living surroundings and all the other living things they depend upon.

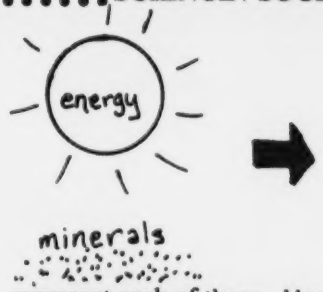
MATERIALS:
Large open area with grass or carpeting; reference materials on wildlife (may be able to do without).

BACKGROUND:
For this activity, you can use an animal that lives in your area or one from a specific Alaska ecosystem that your class has studied or is studying. See the appendix for food chain and food web examples from Alaska ecosystems.

PROCEDURE:
1. ELECT A FAVORITE ANIMAL:
Have the class nominate animals for the title "Our Favorite Animal," then take a vote to choose one.

2. DESCRIBE THE ANIMAL'S ECOSYSTEM AND ASSIGN PARTS TO STUDENTS:
Assign 2 or 3 students to represent the favorite animal. Have the class list the parts of the non-living surroundings that their favorite animal needs--assign one student to represent each of the parts.

Have the class name the living things their favorite animal eats (write these on the board)--assign students to

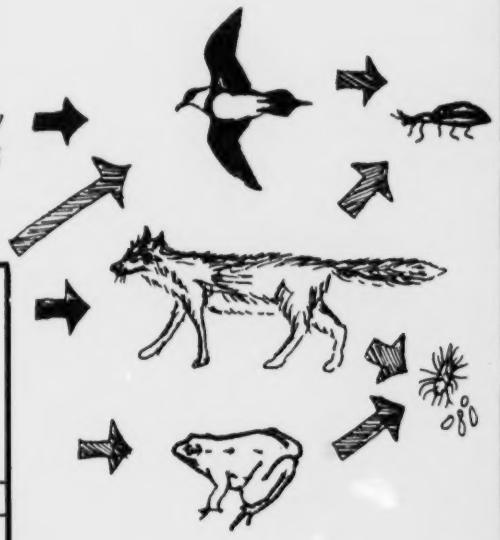


represent each of these. Have students list 2 things eaten by each of these animals (again write on the board), and assign students to represent those. Have students list 2 or 3 living things that make the oxygen needed by their favorite animal; write these on the board and assign one student to represent each one. Determine if there are other living things that help any of the living things so far listed (don't forget pollinators, seed carriers, etc.). List these on the board, and assign students to represent them.

3. CHOOSE THE LEAST POPULAR LIVING THING:
Have the class choose the least popular living things listed (or have the class vote on their least favorite animal--from those listed on the board.) Ask the class if they think it would matter if people did something that caused the unpopular thing to die out. (For example, if humans spread a poison that killed that organism, or destroyed its habitat.

4. PLAY A GAME:
Explain that they are going to play a game to find out. Have students stand (or squat) in a circle on the grass or carpeted area. They represent parts of an ecosystem--but they are not yet an ecosystem, because they are all standing alone. In order to represent an ecosystem, they all must become interdependent. Ask them to place their hands on the shoulders of the person next to them. Then everyone should take a step toward the center of the circle and take the hand of the person just beyond the person next to them. (Hands should be grasped behind the back of the person next to each student.) Then have everyone lean back, knees straight, and walk their feet in toward the center. Then ask the student representing the unpopular living thing to let go. What happens? Was their favorite animal affected? Have the class discuss why we would need to protect all the living things listed on the board in order to protect their favorite animal.

Help save the peregrine falcon....
Protect Craneflies!



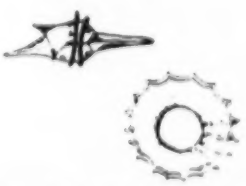
ART EXTENSION:
Have the class make bumper stickers that say: **Help save** (name of their favorite animal), **Protect** (name of their least favorite living thing). Or have the class adopt the unpopular species. (Instead of adopting whales--adopt amphipods. Or instead of adopting hawks--adopt voles) Students can make posters, write poems, paragraphs, or banners declaring the importance of their unsung wildlife hero.

Who Needs Who

Name_____

_____

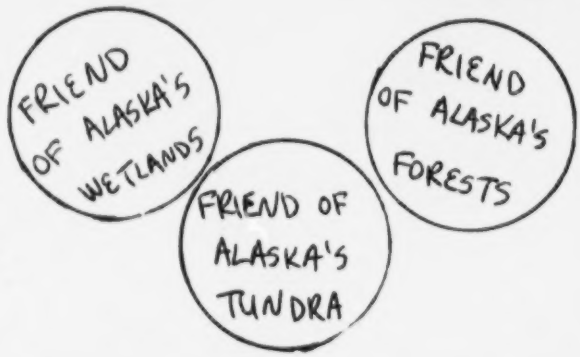
_____

We want to conserve populations of this animal.	Circle all the living things that we'll need to conserve, if we want to protect the animal listed in the first column.
chickadee	woodpecker fungi tree insects
wolf	plants insects dall sheep certain bacteria and fungi
weasel	vole berry-producing plant fungi
harbor seal	fish  tiny animals that live in the sea algae

Alaska Wildlife Week Unit 4. ©1996 ADF&G

BEST COPY AVAILABLE

Alaska ocean ecosystem



OBJECTIVE:

Students will develop a sense of personal responsibility for helping wildlife and avoiding or minimizing actions that harm the environment.

BACKGROUND. This unit is designed to allow students to apply the awareness gained from evaluating how human actions affect wildlife and the ecosystems upon which they depend. The introductory activity re-visits the introductory Ethi-thinking activity in the first unit and subsequent activities are designed for them to identify alternatives to actions that harm wildlife, including actions that they can take. A "Can Do!" activity is included so you and your class can carry out a specific project to benefit wildlife.

For more background for you as the teacher about problems of use and conservations of specific Alaska ecosystems, refer to the following sections in past Alaska Wildlife Week materials:

Alaska's Wetlands: Water Pollution and You, page 33 and Table 1, Some Effects of Water Pollution on Wildlife, pp. 50-53, Unit 2 Teacher's Guide

Alaska's Forests: Lesson 5, pp. 47-48, Unit 5, Primary Teacher's Guide

Alaska's Tundra: Lesson 5, pp. 63-64, Unit 6, Primary Teacher's Guide

In this lesson, we are highlighting one significant problem for wildlife, that of litter that can entangle fish or wildlife or can be mistaken for food items.

National legislation was passed in 1988 to help control marine litter in our oceans, but solving the problem depends on efforts by citizens to change their habits of disposing of plastic and to clean up plastic that washes up on beaches. "Plastic Jellyfish " (an activity from the Aquatic Project Wild book) is included in this unit as an example of an activity that is a great lead-in to a project to initiate or participate in a community beach or stream clean-up. Governor Cowper has declared May, 1989, is "Marine Litter Clean-Up Month" in Alaska. If you live along the coast, contact your local clean-up coordinator or for information about how your class can become involved. If you don't live along the coast, look for information about local spring clean-ups or pick a likely area (e.g., schoolyard, beach, field trip site) and organize your class to carry out a clean-up.

Additional Project Wild activities that are related to potential projects for your class to undertake locally include **Litter We Know** and **Environmental Barometer**.

ETHI-THINKING, REVISITED

OBJECTIVES:

Students will 1) apply their evaluations of the effects of human activities on ecosystems to revise their list of activities that humans do that are helpful or harmful to wildlife, 2) discuss reasons why harmful activities are inappropriate, and 3) recommend alternative activities that are not harmful.

Subjects: Social Studies, Science, Language Arts
Skills: Analysis, generalization, description, discussion
Groups Size: Any
Setting: Indoors or outdoors

BACKGROUND:

This activity can be used to review and extend the initial concept of helping and harming wildlife. It is also a good introductory activity for the activities in this unit.

PROCEDURE:

1. REVIEW THE LIST OF ACTIVITIES FROM THE "ETHI-THINKING" IN LESSON 1:

Ask the students if they have changed their mind about any of the activities that they listed as helping or harming wildlife. Can they think of others?

2. DIVIDE THE CLASS INTO GROUPS AND PASS OUT THE HUMAN ACTION CARDS THAT SHOW ACTIVITIES THAT CAN HARM WILDLIFE:

Count students off into groups of 4 each. Hand out one card to each group. Ask them to discuss:
- What is happening?
- Could it harm wildlife? How?
- Does it seem appropriate or inappropriate behavior? Why?
- What else could happen that would satisfy human needs without harming wildlife or the environment?

3. HAVE THE GROUPS COMMUNICATE TO OTHER GROUPS:

Ask each group to report to everyone else about their feelings concerning what is happening in the picture and the alternatives they identified. Older students can dramatize their alternatives with skits, "commercials," songs, poems, etc.

Some people leave plastic fishing line along the shore of rivers where animals can get tangled up in it.

Some people build roads in the forest. They have to cut down trees to do this.

Some people use special kinds of stoves and cars that do not pollute the air as much as other kinds.

Some people are very careful about their uses of water and use as little as possible.

INVITE A RESOURCE MANAGER TO CLASS

OBJECTIVE:

Students will practice listening and questioning skills while becoming more aware of how resource managers help wildlife.

BACKGROUND:

This can also be used as a follow-up to Lesson 3 or as an introduction to "Can Do!"

MATERIALS: A local resource manager to come to your class (students in rural areas could write a letter from the classs to a resource agency instead).

PREPARATION:
The Project Wild activity **Wild Work** is a good preparation for this activity.

PROCEDURE:

1. INVITE A LOCAL RESOURCE MANAGER TO CLASS. Ask a local resource manager to come to your class to discuss management of wildlife habitat or other management activities that benefit wildlife. (You could ask someone from the Alaska Department of Natural Resources, the Alaska Department of Fish and Game, U.S. Bureau of Land Management, National Marine Fisheries Service, or U.S. Fish and Wildlife Service). Ask these individuals to prepare a short talk on the topic and to address the importance of resource conservation, and to be prepared to answer student questions. Ask the manager to mention ways the students can help take care of wildlife or public lands. If you plan to do "Can Do!" project (see the activity in this packet) or a community project to improve wildlife habitat (see **Improving Wildlife Habitat in the Community** in the Project Wild guide) , ask the resource managers for ideas about what your class could undertake.

2. HAVE STUDENTS PREPARE QUESTIONS: Ask each student to write down one question about the management of a specific area or on a specific Alaska ecosystem for which they would like to know the answer, and be prepared to ask this question of the guest speaker.

3. REVIEW PUBLIC OWNERSHIP OF WILDLIFE HABITAT IN ALASKA AND THE JOBS OF RESOURCE MANAGERS: Before the manager speaks, explain that the managers of Alaska's public lands are responsible for making sure that resources are conserved--which means used wisely, or taken care of. They may be wildlife managers, foresters, mining experts, or archaeologists. Discuss why managers need lots of information about ecosystems and must think very carefully about how resources are used. Discuss why managers often make regulations about the use of certain areas or about how wildlife should be treated.

4. SUMMARIZE WAYS THAT STUDENTS CAN HELP MANAGERS TAKE CARE OF WILDLIFE AND ECOSYSTEMS: Help them think of obeying regulations on using an area, and learning more about wildlife habitat needs and ecosystems.

FRIEND OF THE ECOSYSTEM • • • • • • • • • • • • • • • • • • • SOCIAL STUDIES / ART

OBJECTIVE: Students will think about their personal responsibilities to care for Alaska's wildlife and ecosystems.

Materials: None

Procedures:

1. DISCUSS OWNERSHIP OF ALASKA'S LANDS. Ask students what they should do with things they own -- such as a plant, a pet, a yard, or a garden. (They should recognize that they have to take care of these things.) Review the tact that much of Alaska's lands belong to the public -- and that includes them. What should they do since they own much of Alaska's lands?

2. HAVE STUDENTS REVIEW THINGS PEOPLE DO FOR THEIR EFFECTS ON THE ECOSYSTEM: Using the Human Action Cards, have the students determine the things people do that help or hurt the ecosystem. Then discuss whether those things that harm the ecosystem should be allowed, but controlled, and which should not be allowed at all.

3. DISCUSS HOW STUDENTS COULD HELP AN ECOSYSTEM:
Discuss whether students do some of the listed activities. Do they do any of the things that help wildlife or the ecosystem? Do they do anything that requires someone else to harm wildlife or the ecosystem?
Compare the use of things from the ecosystem that are renewable (e.g., wood, berries) to resources that are not renewable (e.g., oil and gas, minerals). Add a third category to the board: "Things We Must Do Carefully;" help students recognize the some human activities which use renewable resources and which can harm wildlife should be listed in this category (e.g., wood harvest activities).

4. HAVE THE STUDENTS WRITE A "FRIEND OF THE ECOSYSTEM" PLEDGE.
Discuss the idea of a pledge (the pledge of allegiance or scout's pledge could serve as examples of pledges). Ask students what they think would be a good pledge for a "Friends of Alaska's Forests Club" (or "Friends of Alaska's Wetlands" or "Friends of the Tundra").

ART EXTENSIONS:

Have students make a button or patch for members of the Friends club.

If you are using a forest ecosystem as your example, have your students complete the worksheet "**Forest Friends,**" Worksheet 5 in Unit 5 of Alaska Wildlife Week (page 52). If you are using the wetlands or tundra ecosystem, have the students draw and color things they can do to help or harm the ecosystem or wildlife in the ecosystem and things they should do carefully.

SOCIAL STUDIES EXTENSION:

Have the students each develop a series of rules that they think that they should personally follow to avoid harming wildlife as much as possible.

CAN DO!

Objectives

Students will be able to: 1) identify a problem involving wildlife on their own school grounds; 2) suggest and evaluate alternative means by which to either solve the problem or at least improve the situation; 3) successfully undertake the project; and 4) analyze and describe the process by which they successfully solved the problem or improved the situation.

Method

Students select a school environmental project; conduct research; make plans; and follow procedures to accomplish the project.

Background

Each of us can make constructive contributions to improving the environment in which we live. Sometimes our actions can improve the environment for people, sometimes for wildlife, and sometimes for both. Sometimes our effectiveness can be improved if we work with other people—sharing ideas, information, and skills.

A working knowledge of the following terms will be useful to students in this activity:

Problem—a difficult situation to be improved, or an opportunity to make things better. Problems can't always be "solved," but situations can usually be improved.

Authority—an individual or group of people with the power to make changes.

Compromise—a way to settle a problem in which both "sides" usually give a little.

Given that it is important for young people to learn that they "can do" for people, wildlife, and the environment—use your judgement in the course of this activity to assist students in selecting a project that is realistic, constructive, and possible. If not, the students may experience an activity that contributes to their thinking that they "can't do."

The major purpose of this activity is to provide students an opportunity to experience success in taking constructive actions to improve the environment for people and wildlife.

Materials

writing materials

Age: Grades 2—9
Subjects: Social Studies, Language Arts, Science
Skills: analysis, application, description, discussion, evaluation, invention, listing, public speaking, problem-solving, small group work, synthesis, writing
Duration: minimum of three 45-minute periods
Group Size: any
Setting: outdoors and indoors

Key Vocabulary: problem, authority, compromise, constructive, realistic, effective, alternatives

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Procedure

1. Ask the students to think of some ways in which they could improve areas of the school grounds as a home for wildlife. They might generate a list of activities on their school grounds that have a negative impact on wildlife. The list might include litter that poses a hazard for some kinds of wildlife; a muddy area that birds use for water but that has been recommended for blacktopping to minimize dust and mud; a proposed pesticide spraying that will not only kill the "pest" but perhaps affect other plants and animals; removal of a tree that presently helps contribute to cleaning the air, produces oxygen, and serves as a food and shelter source for varying kinds of wildlife, etc.
2. Looking at the list of possible problems and suggestions for ways to improve wildlife habitat at school—ask the students to select one they think they could realistically handle and do something constructive about. If there is difficulty in deciding which one, and reasonable support has been offered for each, the students might vote to decide. Students could also make speeches in support of the project they want to tackle, in hopes of swaying the class vote.
3. Once the project has been selected, ask the students to work alone or in small groups to begin to generate ideas for possible solutions to the problem and ways to implement the project. Each individual or small group could come up with a plan, including a written description and illustrations or sketches of how it will work, and how it can be accomplished.
4. Ask the groups to present their plans to the rest of the students. Students may ask questions for clarification. Once all the plans have been presented, ask the students to select the plan that seems most: a) constructive; b) realistic; c) helpful to wildlife; and d) apt to make a lasting contribution.
5. Also ask the students to select one or more alternative plans, in case their first choice is not acceptable to authorities at the school.
6. Once a plan, with alternatives for "back up," has been selected—ask the students to select a delegation to present their proposal to the school principal or whomever the appropriate authority would be. Remember janitors, groundskeepers, school board, etc.—anyone who would be physically and/or officially involved. A practice session before the students and any interested parents or other groups of students would be helpful. At the practice session, the student delegation would make their presentation as they plan to before the principal, janitor, etc.—responding to any questions from their audience that might be raised.
7. The students should make an appointment to present their proposal, make the presentation, and report back to their classmates. If their plan is accepted, they should make sure they know who to contact next in order to successfully complete their project. Making sure they have all necessary permissions secured, the students should proceed to successfully accomplish their project.
8. Once accomplished, ask the students to analyze their results. Did things work out like they wanted them to? Were there any surprises? Any unforeseen problems? How might they have been any more effective?

For information on which plants to use to attract or benefit Alaska wildife and for landscaping "how tos," see "Landscaping for Wildlife in Alaska," Wildlife Watcher's Report No. 2. This pamphlet is available at Alaska Department of Fish and Game offices, or write to the Nongame Wildlife Program, ADF&G, 333 Raspberry Road, Anchorage, AK 99518.

To extend the Can Do! project into your community, see the Project Wild activity **Improving Wildlife Habitat in the Community.** The Project Wild activity, **Keeping Score,** can help identify community needs for habitat improvement.

PLASTIC JELLYFISH

Objectives

Students will be able to: 1) describe the potential effects of plastic waste on aquatic wildlife; and 2) identify specific actions they can take to help remedy the problem.

Method

Students monitor the plastic waste production in their own households, research its effect on freshwater and marine life, and propose various ways to lessen the problem.

Background

In both marine and freshwater environments, plastic waste materials have potential negative impacts on wildlife. For example, aquatic animals mistake some plastics for food. In other cases, they become entangled in plastic debris and subsequently die.

The Cousteau Society estimates that six million tons of litter enter the sea each year. Most of this is the product of merchant ships and the practice of dumping garbage in the sea. Among the most damaging kinds of solid waste from litter are non-biodegradable plastics. Plastics simply do not decay. Commercial fishing fleets are estimated to have lost nearly 300 million pounds of plastic fishing gear in 1975 alone. It is this plastic netting material that may be the greatest hazard to marine life. Few fish or marine mammals can swim backward. Once entangled, nearly all animals perish.

Scientists estimate that plastics are killing up to a million seabirds and over 100,000 sea mammals a year. Recently plastics have been found in the stomachs of whales, dolphins, fish, birds, and manatees. Leatherback turtles often mistake plastic bags floating in the sea for jellyfish, one of their favorite foods. As plastics accumulate in the intestines of such animals, starvation occurs slowly.

It is not just in marine environments that plastic litter can be found which has potential to harm aquatic life. Plastic holders for beverage cans, plastic bags, and lost or discarded fishing line on land can all be damaging to wildlife.

Some creative actions are also being explored to use plastics and other materials to enhance, rather than damage, habitat for wildlife. For example, wildlife specialists are experimenting with ways to use plastics intentionally to provide anchoring sites for aquatic organisms in lakes where grasses no longer grow. Some are using

Age: Grades K—12
Subjects: Science, Social Studies
Skills: analysis, application, classification, discussion, hypothesizing, identification, inference, interpretation, observation, problem solving, recognition, synthesis
Duration: one 20-60 minute period or longer
Group Size: any
Setting: outdoors and indoors

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plastic bottles and jugs to provide a microhabitat for certain fish. These actions are beginning to have what appear to be beneficial effects. These positive examples, however, are presently overshadowed by the considerable damage being done to wildlife and its habitat as a result of plastic litter.

There are a variety of sources of useful information about the subject of plastic litter and its impacts. One helpful reference is the publication *Plastics in the Ocean: More Than a Litter Problem*, prepared by and available from The Center for Environmental Education, 1725 DeSales Street N.W., Suite 500, Washington, D.C. 20036. Actions can be taken to help reduce plastic litter and its negative consequences.

The major purpose of this activity is to enhance students' awareness of the hazards of plastic waste for wildlife in aquatic environments, having them explore ways they can take action to reduce its effects.

Materials

plastic waste from home

Procedure

1. Ask the students to collect and save every piece of plastic waste produced in their homes for a two-day period. Have them bring these materials to school. Or, have them bring a sample if the quantity is too great! Caution the students to clean the plastics before bringing them to school so that they are free of food or drink remains. Also caution them about toxins such as ammonia, chlorine bleach, etc. which may be in the containers. These should be emptied and rinsed completely.
2. Ask the students to separate these plastic waste materials into categories. Have them classify them in terms of how they might be perceived by aquatic wildlife as food, e.g. very likely to be perceived as food, somewhat likely, or unlikely. Identify the species that might attempt to eat the plastic. Also classify the materials according to the likelihood of aquatic animals becoming entangled with them and subsequently dying.
3. Ask the students to hypothesize about how these materials might affect aquatic animals. Have them check their hypotheses against current findings reported in the literature, or provide them with sufficient information to do so. Ask the students to summarize what they have learned about the potential hazards to aquatic wildlife from plastic waste materials.
4. Invite the students to survey their schoolgrounds or community for plastic litter. Look to see if and where it exists. Investigate its potential negative impact on animals in the community. If there is damaging plastic litter in the community, ask the students to create an action plan that will increase awareness of the problem and help take care of it, e.g., setting up a plastic recycling depot.
5. Help the students put the plan into effect!

Extensions

1. Contact local environmental, conservation, animal welfare, and wildlife groups to see what is being done about the impact of litter on local wildlife and if specific help is needed.
2. Establish a litter patrol. Designate specific targets such as nearby beaches, lakes, and stream beds. Establish scheduled tours of these areas to pick up plastic and other forms of litter.

1989 Clean-ups Scheduled:

Kachemak Bay Coast Walk and clean-up — April 29
Contact: Jo Anne Popham 235-6667

W. Prince William Sound — June 3-4, June 10-11
Contact: Rita Hendrickson 561-1622

E. Prince William Sound — early May
Contact: Stan Stevens, Cordova

Juneau Beach Clean-up — May 13
Contact: Bonnie Lippett 586-8762

Juneau Community Clean-up — May 12
Contact: Judy Kennedy 780-4333

Petersburg — April 24-31
Contact: Merilee Jones 772-3841

Ketchikan — May 5-13
Contact: Tonya Henderson 224-2148

3. Write a plastic consumption conservation plan! Is plastic recycled in your home or community? If so, how? If it seems appropriate, see if you can break some of your own plastic habits. Consider whether your own uses of plastics could be potentially damaging to wildlife as well as wasteful of natural resources. What courses of action might you personally take?
4. Take various types of plastic and put them some place outdoors where they will not be disturbed for one month. Set up an observation schedule and a means of recording the date and the changes you observe in the plastic samples. What conclusions can you draw from your observations?
5. Investigate the processes for making plastic biodegradable. What progress is being made in this technology? (You will need to do some research in the library for this activity. Perhaps you can ask an "expert.")
6. Find out if there are any laws in place in your city, county, or state which attempt to address the problem of plastic pollution. What about national and international law? Are there any bills before the legislature? Before Congress?

Evaluation

For Younger Students
Which of these things might be most likely to harm animals that live in water: styrofoam pieces, comb, six-pack holder, rope, toothbrush, fishing net, fishing line, candy wrapper, toy airplane.
Tell how animals might be harmed by each of these plastics: fishing net, toy car, clear plastic bags. Which might be most harmful, and why?
Write two things you can do to prevent harm to wildlife from plastic litter.

For Older Students
Give three examples of ways that plastic waste could enter an aquatic food chain. For each, discuss two possible consequences of plastic waste entering the food chain.
Describe some actions you and others can take to help remedy the problems associated with plastic wastes.

MARINE LITTER IN ALASKA

"Nuts and Bolts to Organizing a Beach Clean-up" is available from Judie Nielson, Oregon Department of Fish and Game, Box 59, Portland, OR 97209.

"Trashing the Oceans" a 7 1/2 minute video produced by the National Oceanic and Atmospheric Administration (NOAA), is available for loan from Dolores Scott, Project Wild coordinator, ADF&G, Division of Wildlife Conservation, P.O. Box 3-2000, Juneau, AK 99802.

For a complete list of resources to teach about marine litter, contact: Joaqlin Estus, Division of Governmental Coordination, P.O. Box AW, Juneau, Alaska 99811 (465-3562).

APPENDIX

ALASKA FOOD CHAIN AND FOOD WEB EXAMPLES

Six food chain examples for forest, tundra, wetland and ocean are shown in bold letters. Make food webs by using the other foods of each living thing (listed in small letters below its name) to find other interconnections. Use with the activities in Lessons 1, 2, and 3 of this unit. Use information provided on the back of the photo poster (from this and Alaska Wildlife Week Units 1, 2, & 3--check your library). See the 1984 unit for more background on wetland food webs.

	PRODUCER	HERBIVORE	CARNIVORE 1	CARNIVORE 2	DETRITIVORE
FOREST	**1. White Spruce**	**Red Squirrel** berries, mushrooms	**Marten** voles, bird eggs		**Mushroom** any dead plant
	2. Willow	**Snowshoe Hare** birch, grass, fireweed	**Lynx** voles, squirrels		**Raven** any dead animal
	3. Grass Seeds	**Red-backed Vole** berries, fireweed	**Boreal Owl** flycatcher, woodpecker		**Fly** any dead animal
	4. Lingonberry	**Pine Grosbeak** spruce and birch seeds	**Goshawk** squirrel, flycatcher, woodpecker		**Bacteria** any dead thing
	5. Fireweed	**Moth**	**Alder Flycatcher** flies, beetles	**Merlin** pine grosbeak	**Beetle** any dead animal
	6. White Birch	**Bark Beetles** spruce	**Downy Woodpecker** moth, berries		**Shelf Fungus** any dead wood
TUNDRA	**1. Lichen**	**Caribou** dryas, willow, sedge	**Brown Bear** sedge, grass, blueberry		**Bacteria** any dead thing
	2. Dryas	**Dall Sheep** willow, sunflower, sedge	**Wolf** caribou, marmot		**Raven** any dead animal
	3. Willow	**Redpoll** willow, sunflower, sedge	**Arctic Fox** singing vole, any dead animal		**Flies** any dead animal
	4. Grass	**Singing Vole** sedge, sunflower, dryas	**Short-tailed Weasel** redpoll		**Springtail** any dead plant
	5. Sunflower	**Butterfly** blueberry, mountain avens	**Golden Plover** flies, springtail, blueberry	**Jaeger** redpoll, vole	**Bacteria** any dead thing
	6. Sedge	**Marmot** grass, sunflower	**Wolverine** fox, any dead animal		**Mushroom** any dead plant
	7. Blueberry	**Willow Ptarmigan** willow, sedge	**Golden Eagle** marmot, weasel, sheep (lamb only)		**Fly** any dead animal
WETLAND	**1. Algae**	**Water Fleas** dead plants, protozoans	**Stickleback** midge, rotifer	**Common Loon** frog	**Bacteria** any dead thing
	2. Pondweed	**Pintail** algae, seeds of sedges	**Peregrine Falcon** phalarope		**Rotifer** any dead producer, protozoans
	3. Algae	**Midge** algae, dead plants	**Wood Frog** flies, mosquitos	**Sandhill Crane** stickleback, sedges	**Water Flea** any dead producer, rotifer
	4. Sedges	**Muskrat** pondweed	**Mink** stickleback, phalarope		**Bacteria** any dead thing
	5. Willow	**Moose** willow, sedge	**Wolf** muskrat, pintail		**Flies** any dead animal
	6. Algae	**Mosquito Larvae** protozoans	**Red Phalarope** midge, water flea, rotifer	**Parasitic Jaeger**	**Protozoans** any dead material, algae
OCEAN	**1. Green Algae**	**Sea Urchin** kelp	**Sea Otter** crab, sculpin, sea star		**Tanner Crab** any dead animla
	2. Kelp	**Snails** green algae	**Sea Star** sea urchin, sea cucumber, shrimp		**Flatfish** any dead animal, snails, fish
	3. Diatom (algae)	**Amphipod** other algae, kelp	**Sculpin** shrimp, sand lance	**Sea Anemone** sand lance, snails	**Shrimp** any dead material
	4. Sea Grass	**Brant** green algae	**Bald Eagle** herring, guillemot, any dead animal		**Marine Worm** any dead plant, algae
	5. Brown algae	**Copepods** other algae, sea grass	**Sand Lance** amphipod, euphausids	**Pigeon Guillemot** sculpin, herring	**Sea Cucumber** any dead thing
	6. Red algae	**Euphausids** other algae, diatoms	**Herring** copepods, sand lance	**Harbor Seal** sand lance, flatfish	**Gull** any dead animal

HUMAN ACTION CARDS - FOREST

Some people cut down trees to get wood to heat their homes.	Some people cut down trees in order to make clearings for farms and to build cities.	Some people leave papers, cans, plastic, and other trash in the forest.
Some people are careless with fires and cause forest fires.	Driving cars around and burning fuel puts a kind of smoke, or pollution, in the air that can kill trees.	Some people cut down, or harvest, trees so that we have wood to use in making paper.
Some people drive cars, trucks, or three-wheelers through forests. This kills some of the trees and other plants.	Some people camp in the forest.	Some people build houses in the forest.
Some people make a lot of noise in the forest and scare forest animals.	Some people mine for metals in the forest. They have to remove the trees and soil.	Some people build roads in the forest. They have to cut down trees to do this.
Some people pick up litter that others left in the forest.	Some people kill all the animals they see.	Some people break off the branches of trees.
Some people plant trees in areas where the trees have been cut down or cleared.	Some people cut down trees to make totem poles, build canoes, or make furniture.	Some people cut off the bark of trees in order to get the materials needed for making beautiful baskets.
Some people are very careful about their uses of paper, and always recycle it.	Some people only drive their vehicles on roads or trails so they won't harm growing plants.	Some people are always careful with their campfires, and always put out all the sparks and coals. This helps prevent forest fires.
Some people put out forest fires started by careless people.	Some people use special kinds of stoves and cars that do not pollute the air as much as other kinds.	Some people are quiet in the forest, and always careful. They try not to break off tree branches, or trample the plants.

APPENDIX

HUMAN ACTION CARDS - WETLANDS

Some people drain wetlands so they can farm crops or raise livestock.	Some people place gravel in wetlands so they can have a place to build a house.	Some people leave papers, cans, plastic, and other trash in wetlands.
Some people get rid of polluted water by draining it into wetlands.	Some people leave plastic fishing line along the shore of rivers where animals can get tangled up in it.	Some people don't obey harvest laws and kill all the animals they see.
Some people drive cars, trucks, or three-wheelers across wetlands. This kills some of the plants and may cause gullies and ditches.	Some people gather berries or leaves to make tea in wetlands.	Some people canoe or kayak down rivers and camp along the shores.
Some people make a lot of noise in wetlands and scare wetland animals.	Some people dig ditches in wetlands which drain some parts of the wetland.	Some people build roads across wetlands. They have to put gravel down and birds no longer nest there.
Some people drive their vehicles on wetlands, leaving permanent tracks.	Some people dam rivers to generate electricity. Downstream wetlands dry up.	Some people use streams for drinking water. In times of drought, the streams dry up and fish die.
Some people cut down trees carelessly so they fall across streams and crush streambanks and plants.	Some people fish and hunt in wetlands.	Some people get together to plan how their town will grow and avoid building in wetlands as much as possible.
Some people are very careful about their uses of water and use as little as possible.	Some people only drive their vehicles across wetlands during winter when snow protects the plants.	Some people plan roads so they go don't have to go across wetlands.
Some people use water to mine for gold and put muddy water back into streams that can clog the gills of fish.	Some people use special kinds of stoves and cars that do not pollute the air as much as other kinds.	Some people are quiet in wetlands, and always careful. They try not to break off trample plants or scare wildlife.

HUMAN ACTION CARDS - TUNDRA

Some people leave papers, plastic, and other trash in the tundra.	Some people build houses, factories, and roads on the tundra. More noise and activity disturbs wildlife.	Some people spray pesticides to get rid of mosquitoes. There are fewer insects and fewer insect-eating birds.
Some people burn gas, oil, and coal to make electricity. Acid rain forms, killing lichens and soil bacteria.	Some people obey harvest regulations for animals such as geese in lowland tundra or goats in the alpine tundra.	Some people put up fences on the tundra. Animals that migrate, like caribou, overgraze their range and many starve.
Some people ignore hunting regulations and kill every animal they see. Musk-oxen, caribou, and goats become scarce.	Some people drive vehicles across the tundra during summer, crushing tundra plants. The permafrost melts and the ground sinks.	Some people drive vehicles across the tundra only during winter when the ground is frozen and there is enough snow to protect plants from being crushed.
Some people gather berries and other food on the tundra.	Some people hunt caribou on the tundra and catch fish in tundra streams.	Some people build oil wells and gravel pads on the tundra. Some birds no longer nest in the area.
Some people strip the plants and soil from the tundra to mine gravel and minerals	Some people are careful to never leave plastic or wire on the tundra which animals could get tangled up in or eat by mistake.	Some people get together to plan how their town or village will grow and use as little of the tundra as possible.

APPENDIX

ETIQUETTE FOR WILDLIFE WATCHERS

Wildlife watchers sometimes unintentionally harm wildlife, ruin opportunities for others to enjoy wildlife, and occasionally place themselves in danger. To avoid these situations, use the following guidelines carefully whenever you observe or photograph wildlife.

MINIMIZE DISTURBANCE OF WILDLIFE

Step softly and quietly while observing animals, replace rocks or logs after looking underneath (to keep the roofs on animals homes), handle animals gently, fill in holes after looking for clams (to prevent suffocation of the animals next door) and don't take live animals or plants away from their homes.

So that other children can enjoy the area, too. Discourage personal collections of any natural items, living or nonliving. Limit collection to educational purposes such as art projects or aquarium study--and return any living animals to their natural habitats as soon as possible. For classroom specimens, preserve only those animals already dead.

Observe animals from a safe distance. Use binoculars, spotting scopes, and telephoto lenses to get a closer look. If an animal shows signs of being crowded or disturbed, sit quietly or move slowly away.

SIGNS YOU ARE TOO CLOSE:

MAMMALS
- Head raised high, ears pointed in direction of observers
- Skittishness-jumps at sounds or movements
- Animal moves away or lowers head, ears back in preparation for a charge,
- Erect hairs on neck and shoulders

BIRDS
- Head raised, looking at observers
- Skittishness
- Excessive preening, or pecking at dirt or foot; bill wiping
- Alarm calls, repeated chirping and chipping
- Distraction display-broken wing, or tail spread

Move slowly, allowing the animal to keep you in view. Avoid sneaking up on or surprising animals.

Limit the time you spend at or near a nest to 5-10 minutes. Do not visit nests during bad weather. Do not disturb the plants around the nest, or handle eggs

or young. Keep far enough away from nesting colonies that you don't flush the birds.

AVOID DANGEROUS WILDLIFE

Familiarize yourself with bear safety. Bears occur in almost every habitat in Alaska. A pamphlet entitled "The Bears and You," available free from the Alaska Department of Fish and Game, provides excellent tips for avoiding bear attacks.

Always keep a good distance between yourself and cow moose with calves. A cow may charge on little prevocation and her flying hooves can seriously injure or kill a person.

Encourage students to leave the schoolyard, forest, river or wetland cleaner than when they arrived.

By working together and following these simple rules we can all enjoy Alaska's abundant wildlife today and tomorrow.